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Role Gene Doping in the Filled of Sport (Analytical Study) By the Researcher

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ABSTRACT

In the summary of our research, this is the idea of producing for a people suffering from severe anemia, as the production of a hormone erythropoietin. Erythropoietin synthesis within *in vivo* is produced by the kidneys. That is why we draw attention to the findings of the latest scientific advances specialized in biotechnology for the idea of designing or producing an industrial gene called a safe gene doping. The idea of original gene doping research and experiments is subject to the anti-doping organization's standards and contexts. The basis of the idea and scientific experiment is the design of the artificial gene is the RNA that translates to erythropoietin, which sends and binds with the receptor cells in the bone marrow that stimulates the production of red blood cells. Red blood cells that are responsible for transporting oxygen to cells and muscles and thus help the athlete in his healthy athletic activities. Biotechnology used in the idea of analytical research is one of the therapeutic methods for athletes with severe anemia. In the mechanism of the gene doping it is for this experiment to use the modified virus, which was considered as a carrier of the artificial gene that is intended to treat a person suffering from severe anemia.

INTRODUCTION

Gene doping is a form of gene modification similar to gene therapy, but rather than altering genes to treat or prevent an illness, they are changed to make normal genes perform differently. Altering genes to enhance athletic performance is the most viable reason for gene doping.

Gene doping represents a threat to the integrity of sport and the health of athletes, and as the international organization responsible for promoting, coordinating and monitoring the global fight against doping in sport in all its forms, WADA is devoting significant resources and attention to ways that will enable the detection of gene doping.

Gene Doping - Gene therapy for restoring muscle lost to age or disease is poised to enter the clinic, but athletes are eyeing it to enhance performance. The nontherapeutic use of cells, genes, genetic elements, or of the modulation of gene expression, having the capacity to improve athletic performance is defined as Gene Doping by the World Anti-Doping Agency (WADA).

GENE THERAPY

Gene therapy is the application of genetic engineering techniques to alter or replace defective genes. Gene therapy is the insertion of genes into an individual cells and tissues to treat a disease in which a defective mutant allele is replaced with a functional one. DNA is used as a therapeutic agent. Genetic diseases, hematological disorders, acquired immunodeficiency syndromes, cancers are mainly treated.

Types of Gene Therapy:

Somatic gene therapy: In somatic cell gene therapy (SCGT), the therapeutic genes are transferred into any cell other than a gamete, germ cell, gametocyte or undifferentiated stem cell. Any such modifications affect the individual patient only, and are not inherited by offspring. Somatic gene therapy represents mainstream basic and clinical research.

Germ line gene therapy: In Germ line gene therapy (GGT), germ cells (spermoreggs) are modified by the introduction of functional genes into their genomes. Modifying a germ cell causes all the organism's cells to contain the modified gene. The change is therefore heritable and passed on to later generations.

They include doping, sports ethics, role of the regulatory bodies and the health hazards to the sports person.

LITERATURE REVIEW

Doping in sport

It is the use of chemical substances or methods in order to alter the performance. It is unethical and against the spirit of sports as well as poses a risk to the health of the sports person . The World Anti-Doping Code includes the following statements in the definition of doping: Presence of a prohibited substance or its metabolites or markers.

History

The first recorded incident of doping was noted by Philostratus and Galerius in ancient Olympic games held in 3rd century B.C. The first rule against doping was built by International Association of Athletes Federation in 1928 by prohibiting the abuse of drug in sports.

Various armed forces distributed amphetamines to their soldiers to stave off fatigue and injury, elevate mood and to improve the intensity of their fights. In 1960, during the summer Olympics at Rome, a Danish cyclist died during 100km team trial race. His autopsy revealed presence of amphetamines.

In 1968, International Olympics Committee (IOC) made its doping controls and ordered the drug testing for the competitors at the Winter Olympic Games, France The first World conference on doping was held on Feb 2-4, 1999 at Lausanne, Switzerland. This conference was arranged by IOC and included all the sports organizations another parties involved in Doping control. In this conference a document named, "Lausane Declaration on Doping" was produced which suggested the creation of an independent International Agency against doping With agreement to the terms of this declaration World Anti-Doping Agency (WADA) was established WADA is responsible for the World Anti-Doping code in order to harmonize the Anti-Doping rules and regulations in all sports and countries.

Role of WADA (WORLD ANTI-DOPING AGENCY)

Its mission is – To promote, co-ordinate and monitor the fight against doping in sports – To protect the athletes right to compete in a doping free sports – To promote the equality among the competitors worldwide

- The main focus lies in promoting education, research and development of Anti-Doping policies for all countries.
- WADA is responsible for the World Anti-Doping Code in order to harmonize these rules in all sports and all countries.
- The WADA Code is adopted by more than 600 national and international sports organizations.
- The main purpose of having the international standards is to harmonize different technical and operational processes of Anti-Doping programs among different countries.
- It works on basis of 5 International standards – Testing procedures – Laboratories – List of prohibited substances and methods – Therapeutic use exemptions – Confidentiality of personal information.

Origin of doping:

Dope from Dutch word Dop-an alcoholic beverage from grape skins, used by Zulu warriors to enhance their power in battle.

Why athlete do dope?

Physiological:

a. Incase oxygen uptake.
b. Build muscles
c. Mask injury
d. Train harder
e. Steady nerves
f. Increase motivation
g. increase aggression

Ethical use: the reasons why athlete and sportsperson may take drugs are:

– As treatments medication for disease
– To enhance performance
– As reaction drugs

Unethical use:

a. Doping is necessary to win
b. Win for any price
c. To be the best the world
d. Tolerance of doping by sport athletes
e. Wining is an ultimate aim of sport

CLASSIFICATION OF BANNED DRUGS:

Category	Class	Examples
Stimulants	Caffeine	
	Amphetamines	
	Cocaine	
Build muscle/bone	Anabolic steroids	Testerone, dihydrotestosterone, androstenedione
	Beta -2 Agonists	Salbutamol, fenoterol
Relaxants	Alcohol	
	Beta- blockers	Labetalol, betaxolol
	Cannabinoids	Marijuana and hashish
Mask pain	Narcotics	Morphine , methadone, heroin
	ACTH	
	Cortisone	
	Local anesthetics	Novacaine, procaine
Increase Oxygen delivery	EPO	
	Blood Doping	
	Artificial oxygen	Perfluorocarbons, synthetic modified hemoglobin
Reduce weight	Diuretics	Furosemide, bumetanide
Mask drug Use	Diuretics	Furosemide, acetazolamide
	Epitestosterone	

The world has directed to use the genetic stimulator technology for athletes instead of steroids for athletes suffering from potentially chronic diseases such as severe anemia and other diseases.

Because doping is illegal, the pressure is to make performance enhancers undetectable, rather than safe. Performance enhancers are produced or bought on the black market and administered in a clandestine, uncontrolled way with no monitoring of the athlete's health.

Gene doping is possible method in modern sports. The more advance the technologies, the more problems will it create.

The international experiences that have used a gene doping;

The historical development of policy associated with gene doping began in 2001 when the International Olympic Committee (IOC) Medical Commission met to discuss the implications of gene therapy for sport. It was shortly followed by the WADA, which met in 2002 to discuss genetic enhancement. In 2003, WADA decided to include a prohibition of gene doping within their World Anti-Doping Code, which is formalized in its 2004 World Anti-Doping Code. In 2004, the Netherlands Centre for Doping Affairs (NeCeDo) and the WADA

have organized a "Gene Doping" workshop. In addition, NeCeDo has published a report on gene doping as an inventory of the possible applications and risks of genetic manipulation in sports. Although there have been no documented cases of gene doping, the science of gene therapy and interest in the techniques by the sports community has risen to a level that makes gene doping inevitable.

The World Anti-Doping Agency (WADA) has already asked scientists to help find ways to prevent gene therapy from becoming the newest means of doping. In December 2005, the World Anti-Doping Agency hosted its second landmark meeting on gene doping, which took place in Stockholm. At this meeting, the delegates drafted a declaration on gene doping which, for the first time, included a strong discouragement of the use of genetic testing for performance.

Recently, German scientists from Tubingen and Mainz have developed a blood test that can reliably detect gene doping even after 56 days: "For the first time, a direct method is now available that uses conventional blood samples to detect doping via gene transfer". See news item: Gene Doping Detectable With a Simple Blood Test.

Research on these possibilities for gene doping are part of the preparatory stage for the first genetically modified athlete . In the opening decade of the twenty-first century there was much talk and concern about the future possibility of gene doping, with some researchers, coaches, and athletes believing that as soon as gene therapy becomes a well-established technique, gene doping or genetic engineering of elite athletes will also become a routine practice.

At the 2012 in London some speculated that gene that gene doping had become. The case that caught people's attention was that of 16-year-old Chinese swimmer Ye Shiwen. Relatively unknown in international swimming before the Olympics, she won two gold medals, set a new world record, and significantly improved over her previous best times. But what especially caught judges' and officials' attention was the fact that she beat the male world champion's time. The at fact, combined with the officials' experience with similar remarkable performances being the result of doping, brought Ye under suspicion. The officials described her performance as literally unbelievable because it shouldn't have been possible. She passed the drug tests, however, which led some officials to claim that genetic modification was one plausible explanation for her startling performance (Bull 2012; Naish 2012). The Chinese denied the charge, and as gene doping cannot yet be tested for, the dispute could not be resolved by scientific evidence. Nonetheless, many in the sports world believe that some athletes are also trying or about to try doping. Scientists feel certain that even if gene doping did not occur at the 2012 Olympics,

Its emergence is nevertheless inevitable. On the other hand, biogenetical scientists temper high expectations like these, and think it is rather unlikely that in the near future the fiction of the genetically modified athlete will become reality. Many genes are involved in athletic performance, especially in those sports that do not just measure force or speed . There are complex interactions among different genes, and there are complex interactions among genes and the environment There is not one crucial gene for sport talent , which can be identified, inserted, or modified at will. Notwithstanding these diverging interpretations of future scenarios, there is no doubt that biotechnological developments will raise and stimulate a broad spectrum of ethical and socio-political question. Sport, Biotechnology, and Ethics General basic principles, like autonomy, privacy, justice, equity, and human dignity have been applied to reach an international consensus and to harmonize national regulations on biotechnology. It is, however, questionable if conventional human rights meet all the dilemmas that will arise from modern biotechnology. Some of the following human rights come into play with the engineering of human genes.

CRISPR METHOD TO GNEN THAERPY USE (GENE DOPING)

CRISPR is a genetic modification technology that allows the DNA of an organism, including humans, to be modified, and scientists seek to use in treating diseases, in exchange for concerns.

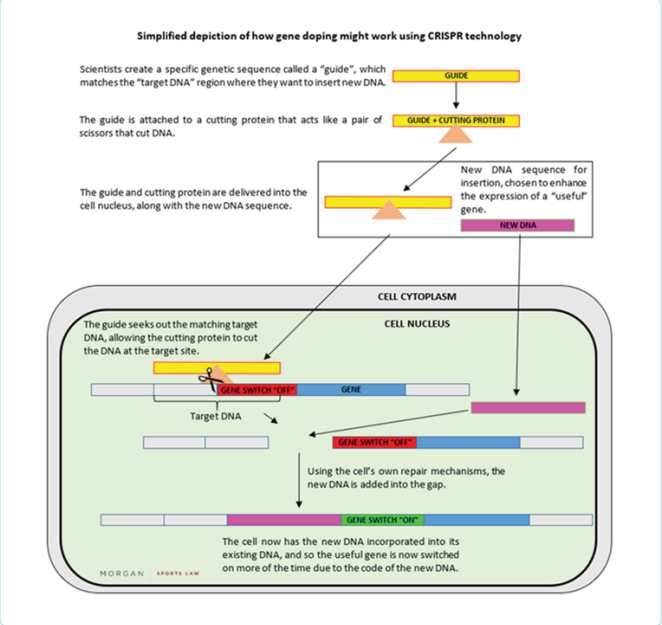
It enables CRISPR technology to be inexpensive, easy to use, and allows scientists to modify genes through a genetic "scissors" comparable to a word processing program, and it can monitor genetic abnormalities and replace them with other elements in DNA.

The CRISPR technique relies on an enzyme called Cas9, which uses a guiding molecule of RNA, which targets the desired portion of DNA, then modifies the DNA, in order to break down the genes, or create the required sequences, according to a report published in the journal Nature in 2015.

And "CRISPR" scientists have been able to refine the cell's DNA with an unprecedented degree of accuracy, and scientists are seeking to use the "CRISPR" technique to fix genetic problems in human embryos, humans treat diseases.

The technology allows scientists to change which gene they actually target, which opens up new horizons in genetics because of its ability to quickly and effectively modify genes. But concerns about the use of this technology in human reproductive cells or embryos in their early stages in these changes will be transmitted to the following generations, and may also be used to produce what are called "children on demand".

It must also be a safe "CRISPR" technique, that genetic modification is effective, and that it does not cause any changes elsewhere in the genome that may cause damage.



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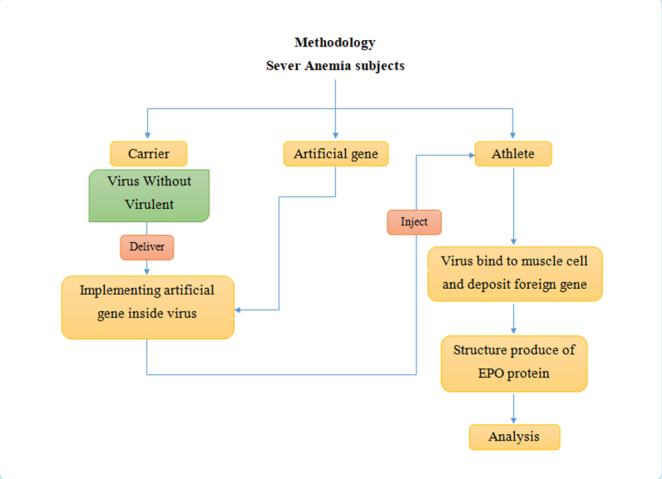

In generally gene artificial is given to athletes in three ways :

1. Direct injection of DNA into muscle.
2. Insertion of genetically modified cells.
3. Introduction utilizing in virus.

In our research project we will deal with Introduction utilizing in virus to understanding project idea, because easy experiment the procedure from another the ways.

Mechanism of gene doping:

Repoxygen is a new way to artificial enhance to athlete's performance that hard to detect and poetically permanent effect.

How it works

Repoxygen was developed as gene therapy treatment for severe anemia A patient injection with harmless virus carrying modified gene that encoded erythropoietin . A protein that boosts red blood cell production . The hosts cell can translate that gene into actives proteins as is foreign gene were the cell own.

Delivery

DNA package in a virus injected into athlete and flow through blood stream into muscle .

The viruses not the only way delivery performance enhances genes to cell. Fat molecules or naked DNA can be injected directly into muscle.

Change

Viruses bind the muscle cell and deposit foreign gene inside, where it integrates into the cell chromosomes. The gene doping produce of the protein erythropoietin.

Dispersal

Erythropoietin (EPO) produced by athlete muscle cell, flows through blood stream to bone marrow, stimulating production of red blood cell. The body's main transporter of oxygen.

Enhancement

Extra red blood cells flow throughout the athlete' s body Increasing oxygen capacity and hence endurance.

EPO AND WHY IS IT USED

EPO is protein hormone produced by the kidney. After being released into the blood stream it binds with receptors in the bone marrow, where it stimulates the production of red blood cells.

DISCUSSION

During the study of the technique of gene doping, where the virus was transmitted to the body, it is possible to obtain a risk to the athlete through the dangerous changes and reactions of the immune system. Perhaps the technician or process work itself is not very efficient. Also, when inserting a foreign gene, it may cause damage cell own genes to have cancer. Therefore determine changes in the concentration of multiple proteins in the blood and monitor their work.

CONCLUSION

The use of sports steroids prohibited by the anti-doping organization for some athletes for the purpose of obtaining unethical and professional gains for rewards and prizes. Therefore, we conducted an analytical study of a safe and special gene doping for some athletes who suffer from chronic diseases or severe hormonal imbalance under the supervision of the Anti-Doping Organization and under internationally recognized standards and contexts.

When some scientists and technologists specializing in this field work to design gene doping, this technology will make a qualitative breakthrough in third world countries for athletes suffering from immunodegeneration or chronic diseases (severe anemia).

However, in light of this evolving science and modern capabilities that work on genetic modification in humans, we must know the disadvantage of that before the use, for example, some athletes may not fit with these changes to the gene doping design that he wants as a treatment for them.

Therefore, you must take all the details completely for the medical condition and the athlete who wants genetic therapy and an integrated specialized study.

Doing this research study is using one of the methods for gene therapy acute anemia disease by using the genetically modified virus to transfer the useful gene to be used for one of the athletes.

Therefore, the production and preparation of the erythropoietin hormone were used for the production of red blood cells of one of the sports patients suffering from severe anemia.

Therefore, after a detailed analytical study of genetic stimulants and the lack of scientific research and experiments related to it, we found several reasons, including:

- No evidence to date for gene doping in athletes
- Accesses technology
- Inefficient technology
- Limited regulation of gene expression

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